

MONOGRAPH ON THE GENUS *STENOCHITON* (ORDER
POLYPLACOPHORA), WITH DESCRIPTIONS OF TWO
NEW SPECIES.

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PLATES XIII. AND XIV.

The genus *Stenochiton* was formed by Adams and Angas in 1864 (Ad. and Ang., P.Z.S., 1864, p. 193) for the reception of the South Australian shell described by the same workers under the specific name of *juloides*.

The characteristics of the genus of which *S. juloides* was the type are enumerated by Adams and Angas as follows:—"Shell elongated, narrow, convex; valves longer than wide, not carinated; apex of the posterior valve subcentral; plates of insertion multifissate in the end valves, the intermediate valves having 5 fissures on each side; girdle covered with very minute, polished, imbricating scales." Carpenter (MS.) refers the then only species known to his own later group *Stenoradsia*, but Pilsbry (in Man. of Con., vol. xiv., p. 55) says:—"Stenochiton, however, seems to have as much individuality as most of the divisions *Ischnochiton*, and may be allowed to stand as a subgenus." He somewhat modifies Adams and Angas' characteristics, retaining the following as the distinguishing characteristics of the subgenus:—"Shell very much elongated, roundly arched, valves ischnoid, the central valves having several slits; girdle having minute, smooth, imbricating scales." As will be shown later, some species that evidently should be placed in this genus only show one slit in the central valves, and in one the scales are minutely striated.

Since Pilsbry wrote the above, two additional species have been described. One by W. T. Bednall in 1897 (Proc. Mal. Soc., vol. ii., pt. 4), under the specific name of *pilsbryanus*. The habitat is given as Troubridge Shoal, Gulf St. Vincent, "on seaweed (?) *Zostera*." A third species was described by myself under the name of *pallens* in 1900 (Trans. Roy. Soc. of S.A., 1900). While I have every reason to believe that one or other of the two species described in this paper as new under the respective names of *posidonialis* and *cymodocealis* must have been the form described by Mr. Bednall, his description will not coincide with either of these very distinct forms. Either his figures and descriptions are at fault, or he described a fifth species that I have not yet been able to identify.

Every effort has been made to get a sight of the type. Mr. E. H. Matthews writes me, February 28, 1918, that he sent all his own and the late Mr. Bednall's types to Mr. Tom Iredale in London. The larger parcel reached London safely; the smaller one, which may have contained the type of this species under review, went down.

Mr. Matthews was good enough to send me some nice specimens that he refers to Bednall's *pilsbryanus*. These are the same species I am describing herein as *S. posidonialis*, and differ materially from Bednall's description in that the anterior valve is concave and not convex, as stated by Bednall, and the posterior valve is very flat and not strongly elevated and arched, as shown in Bednall's drawing, also the mucro is differently placed.

On the other hand, the figure of the posterior valve in Mr. Bednall's paper well illustrates the same valve herein described and figured under the name of *S. cymodocealis*, and his statement that the anterior valve is convex also corresponds, but the figure marked (1) in Mr. Bednall's description does not show the distinctive tapering characteristics in that species, and his statement that the "raised character of the lateral area does not extend to the outer anterior angle of tegmentum" does not correspond.

We are, therefore, with the material available, quite unable to determine which, if either, of these very distinct species was described by Mr. Bednall. Part of the description appears to refer to one and the balance to the other. Personally, in spite of the fact that Mr. Matthews, in common with all other South Australian collectors, has in the past referred the species hereunder described under the name of *S. posidonialis*, to Mr. Bednall's shell, and it is well known in all Australian collections of *Polyplacophora* under that name, I am strongly inclined to think that the other species herein described as *S. cymodocealis*, or one nearly allied to it, is the species described by Bednall. Unless the type is still in existence it will be impossible to satisfactorily determine this question, so for the time being we shall have to add the two species herein described to our list of *Stenochitons*. Iredale and May, in their paper on "Mis-named Tasmanian Chitons" (Mal. Soc. vol. xii., pts. ii. and iii., p. 105, Nov., 1916), think they recognize in Blainville's *Chiton longicymba* (1825) from King Island a member, though not yet identified, of the genus *Stenochiton*. I cannot concur with this opinion, and think that Blainville's shell was more likely either *Ischnochiton virgatus*, Reeve, or a near ally. The blue spots he speaks of are very marked in that species, and the shell is comparatively smooth.

Distribution.—It is remarkable that the whole of the known species of this interesting genus have been described from South Australia. Up to the present I believe there are only two records of the occurrence of members of this genus in the other States. *Stenochiton pallens*, Ashby, from Port Phillip Heads, Victoria, wrongly identified by Sykes (Proc. Mal. Soc., vol. ii., pt. 2, July, 1896) as *S. juloides*, Ad. and Ang., and correctly identified by Gatcliffe and Gabriel (Proc. Soc. Vict., 30 (N.S.), pt. i., 1917, p. 26), one specimen only. And *S. juloides* three valves only in shell-sand, Albany, W.A. (Torr: Trans. Roy. Soc., S. Austr., xxxv., 1911, p. 96). The other localities given by Hedley (in Jour. Roy. Soc. W. Austr., vol. viii., 1914-1915, p. 23) have probably been copied in error from the records of the next species in Torr's paper. We have, therefore, the remarkable fact that outside of the two occurrences above referred to, no representatives of this interesting genus have so far been found outside of South Australian waters.

Habits.—Bednall (in Proc. Mal. Soc., vol. 88, pt. 4, April, 1897, p. 142) gives the habitat of the few specimens of *S. juloides* that had then come under his notice, "found living on Pinna shells below low-water mark." And on the same page he records the fact that the specimens he describes under the name of *S. pilsbryanus* were found on "seaweed (*Zostera*), Troubridge Shoal, St. Vincent Gulf." Dr. Torr (Trans. Roy. Soc., S. Austr., vol. xxxvi., 1912) states that he had collected *S. juloides* by dredging and in shell-sand, and quotes Mr. Riddle as having found specimens on "old boots and bottles, and especially near the roots of *Zostera*, by dredging or with grappling iron—they are rarely found in shallow water." And on the same page he records having taken specimens of *Stenochiton pilsbryanus*, Bednall, "on *Zostera* (sea-weed)." And again, "Two large specimens by Mr. F. L. Saunders on seaweed at Aldinga," and "near the roots of *Zostera* at Wool Bay and other places by Mr. Riddle." I am now able to throw a good deal of light on the habits of members of this genus. The discovery of *Stenochiton juloides*, Ad. and Ang., on bottles, boots, etc., is evidently purely accidental. They live on the marine plant belonging to the order Fluviales known as *Posidonia australis*. I have found them in many localities at the base of the long ribbon-like leaves of this well-known plant. During the last week of December last, at Normanville, in this State, in company with Mr. F. L. Saunders, who with his brother had taken them in the same locality in numbers before, I was able by means of a strong digging hook to get well down into the roots of the *Posidonia*, and found enclosed in the brown sheaths of past leaves which enwrap the underground stems of that plant a large number of this *Stenochiton*. The

spots that seemed to be especially attractive were beds of old, vigorous plants of *Posidonia* growing in sheltered pools (at low water), with a coarse sand or shell-grit bottom. The *Stenochitons* were usually about 3 inches deep in the shell grit, buried in the brown sheaths of *Posidonia*, but in a few cases odd specimens were found on the bases of the leaves outside the sand. Until recently most of the specimens that have been collected were these odd ones that had not worked their way down in the grit. The species hereunder described under the name of *S. posidonialis* also lives on the same plant, *Posidonia australis*, and I have found it in every locality I have visited in this State where this plant is growing. It is almost always found on the white or near the white bases of the leaves, just above the sand, and does not seem to bury itself in it. The best way to obtain it is to pull up bunches of *Posidonia* from as low down as possible, and search the white bases of the leaves for the *Stenochiton*. If held up to the sunlight they are easily perceived, even when on the reverse side of the leaf. The species hereinafter described as *Stenochiton cymodocealis* is found on the cylindrical stems of the marine plant *Cymodocea antarctica*, which belongs to the same order as the preceding. I am indebted to Mr. F. L. Saunders for pointing out this plant to me, he having on a previous occasion taken this *Stenochiton* at Normanville on this plant, but had wrongly identified it as *Stenochiton pallens*, Ashby. I was able to obtain a nice series at that locality, and on searching the same plant afterwards at Cape Jervis, Encounter Bay, and still more recently at Marino, I have been able to find it at all these localities. The favourite spots seem to be the sheltered or shore side of beds of *Cymodocea*, growing in situations more or less sheltered. They are to be found usually only an inch or two above the point where the plant stems enter the sand. In no case have I found them on the short, flat leaves of this plant. The girdle of this *Stenochiton* is in nature strongly incurved, almost reaching right round the cylindrical stems of the plant. The fourth species, *Stenochiton pallens*, Ashby, has up to the present only been found by dredging, and the plant it lives upon has not, therefore, been identified.

Colour protection.—There is surely some connection between the habits of these four species and the markings and colouration that is peculiar to them. *S. juloides* is dark brown in colour, of the same tone as the brown sheath of *Posidonia*. *S. posidonia* is normally yellowish-green, and shell is very transparent, so that it blends remarkably well with the leaf it is on. It is nearly always found on the basal portions of the leaf that are either very pale green or whitish. The markings are suggestive of dashes of darker green on the

leaf. In some case the ground-colour of this species is white, or nearly so, harmonizing well with the lower parts of the leaves. *S. cymodocealis*, while often in colour and markings resembling the darker-green form of the former species, is usually variegated by darker markings, and the dorsal area often shows pinkish shades, thus harmonizing to a striking degree with the various growths that so often encrust the stems of *Cymodocea*. Of the plant which is the host of *Stenochiton pallens* we have, as before stated, no actual knowledge, but we are surely justified in deducing from the habits of its congeners that it lives on a plant probably belonging to the same order Fluviales, that the portions of the plant it affects are probably pale brown, buff, or cream in colour, and also that as only dredged specimens have been found, the plant is either a deep-water species or a pale and colourless variety growing in deeper waters; or perhaps it lives upon the dying or dead leaves, with which undoubtedly its colour would well harmonize.

Food.—I have attempted to keep the three first-named species in an aquarium, supplied with their respective host plants, but although care was taken to keep the temperature cool, they all died, and no results were obtained. Possibly these plants do not throw off sufficient oxygen. I think there is little doubt that *Stenochitons* live on the plants of the order Fluviales, are nocturnal, in common with most of the Polyplacophora. I have seen portions of the stems of *Cymodocea* eaten in a way that would suggest that it had been done by the *Stenochiton*. Further, the *Posidonia* which is frequented by two of the genus is almost invariably clean, no small encrusting growths being present, and therefore it is doubtful whether they would find any other food than the leaves of *Posidonia*. I am indebted to Mr. J. M. Black for the identification of the two marine plants referred to. There is a close outward resemblance between *Posidonia australis* and *Zostera tasmanica*, and therefore, owing to my inability to find specimens of the "sea grass" I have referred to as *Posidonia australis* in flower or fruit, it is possible that Mr. J. M. Black, who has been good enough to examine and identify for me the specimens I sent him, may not have had sufficient data for accurate determination. He says, "Judging only by the breadth of the leaves and the nervation, the specimen sent is *Posidonia australis*, and not a *Zostera*." I think it not unlikely that the two species of *Stenochiton* I have referred to as living on *Posidonia* may live on *Zostera tasmanica* just as freely.

Classification.—The partial elucidation of the life history of members of the genus *Stenochiton* recorded in the foregoing, which supplies strong circumstantial evidence that not

only in habits but also in food they are very distinct from any other of our Australian forms of the Polyplacophora, together with the external characteristics that differentiate them from other genera of the Ischnochitonidae, suggests that further investigation will reveal other differences, possibly internal ones, and warrants the elevation of the subgenus *Stenochiton* to the rank of a genus. I therefore propose to revive Adams and Angas' genus *Stenochiton*, of which *Stenochiton juloides*, Ad. and Ang., is the type. In some respects it is unfortunate that this species should have to stand as the type of the genus, because it exhibits several peculiarities that are not common to those I consider its congeners. For the present we must deem these specific distinctions only. The discovery of three or four new species that show several striking characteristics in common with *Stenochiton juloides*, that differentiate them from other members of the Ischnochitonidae, makes it desirable to retain only a portion of the characteristics cited by Adams and Angas as distinguishing the genus and the adding of others.

Generic description.—Shell usually elongated, highly polished, almost unsculptured, convex, *i.e.*, rounded or arched as distinct from carinated, plates of insertion small, multifissate in the end valves, girdle clothed with very minute, polished, imbricating scales. Living on plants of the order Fluviales. *Stenochiton (sensu stricto)* will then be a subgenus of the genus *Stenochiton*, distinguished by the elongated character of the shell. A second subgenus will have to be formed to receive a broad-shelled species that was collected by the late Professor Tate on plants belonging to the order Fluviales. This specimen has been placed in my hands by Dr. Torr to be dealt with in a future paper.

Conclusion.—I am hopeful that the investigations of future workers, not only in the other States of Australia, but also throughout the world, wherever plants belonging to the order *Fluviales* are found, will, now we know where and how to search, reveal many new forms of this genus. As *Posidonia oceanica*, an allied form to the Australian member, occurs extensively in the Mediterranean Sea and the European shores of the Atlantic, it seems only reasonable to conclude that there will be forms of Polyplacophora living on it that will exhibit some of the modifications peculiar to the *Stenochitons* of Australia.

STENOCHITON CYMODOCEALIS, n. sp.

Pls. xiii. and xiv., figs. 1, 4, 5, 11, and 12 (*a, b, c, d, e*).

General appearance.—Shell long, sides almost straight for $\frac{2}{3}$ of lateral, and then curving rapidly over dorsal area, width of shell less than $\frac{1}{3}$ of total length, dorsal area rounded, shell exceptionally highly arched; the whole shell is very polished.

Colour.—The general colour is green, the dorsal area ornamented with a number of longitudinal pale-green lines, closely packed, and only discernible under lens. The rest of shell decorated with a number of broad, dark-green longitudinal dashes. The megalopores, in the form of pale-green dots, are under a compound microscope visible on the anterior and posterior valves and on the lateral areas, but not as marked as in *S. posidonialis*. Inside of valves green.

Anterior valve.—Slope very steep, without sculpture, convex. In one specimen I counted 24 slits or grooves; the interior in this is irregularly fluted, each flute ending in a blunt rounded tooth, a feature very distinct from any other known member of this genus, or any other member of the Ischnochitonidae, I believe. The slits are continued in shallow grooves, indistinctly pitted. After photographing the interior of this valve it met with a mishap, and is lost, and therefore I have had to replace it with another from a specimen of considerably larger size, which shows considerable differences; the slits are 12 or 13, the teeth are blunt and irregular knobs, the fluted appearance so much in evidence in the former valve is hardly perceptible in this one; perhaps with increased age the fluting is filled in.

Posterior valve.—Highly arched, mucro central, prominent, posterior slope steep, nearly straight, but in type becoming slightly convex as it nears the girdle, shell highly polished, slits 13 to 15, a broad notch in the sutural laminae of this valve.

Median valve.—Uniformly smooth and glossy, the lateral area strongly raised, and if looked at longitudinally with lens, the anterior margin of this area is seen to be uneven, due to shallow sulci following the growth lines; so polished is the shell that this undulating character of the margin of this area is indiscernible unless the shell is held at a considerable angle.

Median and dorsal areas.—Smooth and dorsal area in some valves slightly beaked, 1 slit.

Girdle.—Clothed with small, closely-packed, smooth, imbricating scales, circular in shape, and thick in proportion to their diameter, reminding one of opalescent, flattened pebbles. The dark line showing in plate follows the contour of each valve. In life when looked at from above the only portion of the girdle showing is the narrow strip between this line and the shell. A darkish blotch extends across the girdle opposite each suture and at irregular intervals round the anterior valve.

Measurements.—Total length of type, 10 mm. (shown in plate with girdle flattened out); breadth, 3.5 mm.; the specimen shown in plate with recurved girdle as in nature

measures, length 8 mm., breadth 2 mm. I have specimens that measure 12 mm. by 2.75 mm., girdle recurved.

Locality.—I have found this species on the cylindrical stems of *Cymodocea antarctica* at Marino, Normanville, Cape Jervis, and Encounter Bay, all in South Australia, and Dr. Torr has specimens found in shell-sand at Aldinga.

Specific name.—I have designated this species under the specific name of *cymodocealis*, after the generic name of the plant that is its host, and probably its food plant also. The plant was named after a sea nymph.

Variation.—While the type is green all over, the decoration being due to either lighter or darker shades of the same green, the species is subject to considerable variation both in colour and markings. In one from Normanville, the apex of the anterior valve and the blunt beak of the next four valves is bright pink, also the ground-colour of pale olive that is present in most is in this specimen replaced with silvery-green, the markings mottled instead of striped, and the posterior margins of each valve decorated with 1 to 3 blackish dots, which without the aid of a lens look like pits. One other specimen from this locality has a dark-pink line the whole length of the dorsal area.

Remarks.—This shell is easily distinguished from any other known *Stenochiton* by its highly arched character. The general appearance is that of a canoe turned bottom upwards. This effect is added to by the incurved girdle. In life, with the exception of the anterior and posterior portions, the whole of the girdle curves round clasping the hard cylindrical stem of the host plant, sometimes meeting on the other side. While the animal is able to flatten out the girdle enough to creep about on the surface of a bottle, it is evidently an abnormal position. In endeavouring to flatten out the girdles for figuring purposes I spoilt several specimens, and have, I fear, expanded the valves somewhat, giving a total width beyond what is true to nature.

I am indebted to Mr. F. L. Saunders for pointing out to me the host plant. He had previously found specimens at Normanville, and wrongly identified the shell as *Stenochiton pallens*, Ashby.

I am presenting the type and other specimens figured to the South Australian Museum.

STENOCHITON POSIDONIALIS, n. sp.

Pls. xiii. and xiv., figs. 2, 6, and 13 (*a, b, c, d*).

General appearance.—Shell long, flat, rounded, smooth, and highly polished. The whole shell is exceptionally flat as compared with other members of this genus.

Colour and markings.—General colour olive-green; pleural area white; dorsal area largely white, suggestive of a white streak down the full length of the back. Lateral areas olive-green, with two dark spots on the posterior margins on either side, and a darker olive-green blotch near the apex. All the areas are ornamented more or less with brown or dark olive-green colour streaks. Under compound microscope the megalopores are very pronounced on the anterior and posterior valves and lateral areas of median valves, the surface being apparently peppered all over with white spots. The pleural and dorsal areas under the same power are decorated with a number of white confluent streaks, which in the dorsal area form a complete network or mesh. Inside of shell, pale olive-green and white.

Anterior valve.—Very distinct from others of this genus, in that this valve is distinctly concave, broad, and flat, nearly as long as wide, without sculpture. Under microscope (2-inch objective and eye-piece) this valve is covered with white dots. Inside of valve has 18 slits at fairly regular intervals, each slit continued as a groove, irregularly and deeply pitted, to the apex of the shell. The teeth are sharp, square edged; colour, pale olive-green and white.

Posterior valve.—Longer than wide, mucro anterior, hardly distinguishable, but in large shell from Cape Jervis the mucro is practically median; posterior slope very flat, almost straight, but slightly concave. This feature is nothing like so noticeable as in the anterior valve. Slits 19, each continued in a groove to mucro; margin of teeth between slits slightly crenulate under 2-inch objective.

Median valves.—Uniformly smooth and glossy. The lateral area is raised, but not as strongly so as in *S. cymodocealis*. Slits 2 (in one case a suggestion of a third); the slits are continued in grooves deeply pitted for their whole length. The dorsal area is not beaked in some valves, but in others slight beaking is perceptible.

Note.—In a large specimen 20 mm. long, breadth just under 5 mm. collected by myself at Cape Jervis, the lateral area is distinctly raised, the line of demarcation between it and the pleural area being clearly defined from the dorsal area to the girdle. Two or three strong concentric sulci, following the growth lines in the lateral areas, are present, giving a slightly corrugated appearance to that area. Similar shells to these large Cape Jervis ones were obtained by Dr. Torr at Corny Point, Yorke Peninsula. Pleural and dorsal areas smooth, highly polished. Under 2-inch objective and eye-piece both these areas are apparently thickly grooved with shallow wavy

grooves that coalesce in places, but by holding the shell sideways a good lens reveals the fact that the shell is absolutely unsculptured. Dorsal area is not beaked.

Girdle.—Less than .5 mm. in width. A dark blotch extends across the girdle at each suture and irregularly in front of the anterior valve. Is covered with small, closely-imbricating scales, only a portion of their rounded ends being visible, but which are when exposed found to be flattened, elliptical, rounded at ends, straight-sided, about twice as long as wide. The outer two or three rows are drawn out into coarse, transparent hairs or spicules, forming a distinct fringe.

Measurements.—Type (flat view in figure in plate): length, 9.5 mm.; width, including girdle, 3.5 mm.

Localities.—I have found it on the eastern side of Gulf St. Vincent wherever I have searched for it on *Posidonia australis*; also at Port Lincoln; and Dr. Torr has found the large form exceedingly plentiful at Corny Point on Spencer Gulf.

Specific name.—I have designated this species under the specific name of *posidonialis*, after the generic name of the plant which is its host, and probably its food plant. It is always, as far as my experience goes, found near the whitish base of the ribbon-like green leaves of *Posidonia australis*, just above where the leaves enter the sand. The plant was named after Poseidon, a god of the sea.

Variation.—While the normal colouration is transparent green to olive-green, flecked or streaked with dark-green markings, in some specimens obtained by myself at Marino, and others collected by Dr. Torr at Corny Point, up to 15 mm. in length, the ground-colour is almost white, ornamented with a V-shaped, dark-brown blotch in anterior and posterior valves, and a V-shaped brown marking covering each dorsal area; the whole of the 4th valve and lateral area of the 3rd valve also dark brown. In a specimen, 17 mm. long, from Largs, sent me by Mr. E. H. Matthews, the ground-colour is dingy buff, with a V-shaped brown blotch on 1st and last valves, and a brown streak continuing through all the dorsal areas. Dr. Torr has also a similar specimen. In another of Dr. Torr's, the shell is orange colour.

Remarks.—This shell is easily distinguished from any other known *Stenochiton* by the shape of the anterior valve, which is distinctly concave, the general flat character of the shell, and the exceptionally flat posterior valve, the mucro being hardly perceptible. The figure in plate showing side view will sufficiently demonstrate these differences.

I am presenting the type to the South Australian Museum.

STENOCHITON PALLENS, Ashby

(Trans. Roy. Soc. S. Austr., vol. xxiv, p. 86, 1900).

Pl. xiv., fig. 14 (a, b).

General appearance.—Shell glossy, elongated, evenly arched and rounded, side slope curved. *Colour*—Cream, mottled with pink and pale brown.

Anterior valve.—Smooth and glossy, except for several growth-lines, that nearer the outer margin being the deeper. This valve is longitudinally very short, being twice as wide as long (see measurements). Slits 13, at very irregular distances apart.

Posterior valve.—Shield-shape, tapering rapidly; mucro posterior, only slightly raised. A deep sulcus traverses the valve a short distance from the margin, preserving the shield-like outline of the shell. A shallow diagonal depression crosses the valve from the mucro to the suture. Surface of shell glossy and smooth, slight growth-lines visible under the microscope. Slits six; the teeth are very irregular in contour.

Median valves.—Uniformly smooth and glossy, showing numerous growth lines, which are continued right across the dorsal area. The three areas are hardly distinguishable, except that the lateral area is slightly raised. The posterior margin is finely serrated like a file where the valves are not worn; this sculpture is very shallow. Four of the median valves have one broad wedge-shaped slit on each side; two valves have two slits on each side. *Inside of shell* glossy white, sinus broad and shallow, sutural laminae only slightly produced.

Girdle.—Under pocket lens appears whitish and felt-like. The margin fringed with white spicules, but under 1-inch objective the girdle is seen to be crowded with masses of small, irregular, imbricating scales, which are finely striated. Owing to the condition of girdle I have been unable to determine the exact shape of scales or verify the statement that they are finely striated. In the foregoing I have where possible followed the original description.

Measurements.—Anterior valve of disarticulated type, longitudinal length 1.75 mm., breadth 3.5 mm. Anterior valve of co-type, longitudinal length 2.5 mm., breadth 5.5 mm. Posterior valve about the same width at anterior margin as valve is long. Width 5 mm., tapering evenly to 2 mm., then rounded off abruptly. Length of valve, 4.5 mm. Valves 2 to 6 are all 6 mm. wide and about 3 mm. in length at the dorsal area, and are therefore twice as broad as long. Valve 7 tapers a little.

Habitat.—I think the statement in the original description, Gulf St. Vincent, is probably correct, but one of the

three original specimens dredged by Dr. J. C. Verco, now in Dr. Torr's collection, is labelled "Spencer Gulf." Messrs. Gatliff and Gabriel have now added Port Phillip Heads, Victoria, as a locality (see previous reference). At present our knowledge of this species is limited to four specimens.

Remarks.—Under this heading in the original description the statement in the second line, "the first valve being the broadest," should have read "the first median valve being the broadest." A reference to the measurements given above will clear this up.

The great breadth, in proportion to its short longitudinal length, of the anterior valve easily distinguishes this species from any other known form.

I am presenting type to the South Australian Museum.

STENOCHITON JULOIDES, Adams and Angas (Proc. Zool. Soc., 1864, p. 193; *op. cit.*, 1865, pl. ii., fig. 15).

Pls. xiii. and xiv., figs. 3, 8, 9, and 10.

As no description, I believe, of this species occurs in any Australian literature, it may be well to redescribe it here.

General appearance.—Shell very solid and elongated, sides much curved, the arch being continued evenly from the girdle right over the dorsal area. Width of shell, one-seventh of total length. The whole shell highly polished.

Colour and markings.—Colour dark chocolate, merging in the pleural areas into maroon. (Col. Plates Soc. Française des Chrysanthémistes, 343, No. 4, and 341, No. 3). Many specimens are much flecked and streaked with grey dashes, giving a grey-chocolate effect.

Inside colour.—Anterior valve bluish-grey, others whitish-grey with the brown of outer shell showing through.

Anterior valve.—Strongly convex, considerably longer than wide, unsculptured except for several shallow sulci following the growth-lines, highly polished, inside many slits, counted 17, which are continued in grooves to the apex; the pitting of these grooves is only just discernable under a 2-inch objective and eye piece.

Posterior valve.—Mucro posterior (Carpenter states median), the anterior portion of valve quite smooth and rounded longitudinally, forming a V-shaped area the full width of the valve at the suture (in the specimen described 5.5 mm. wide and a length to the mucro of 5 mm.). The posterior portion is highly polished and unsculptured, except for a number of concentric sulci following the growth-lines. The posterior area where it abuts on the anterior V-shaped portion is highly raised, the anterior margin forming a rounded diagonal ridge; this ridge is formed by a deep sulci

commencing quite shallow at mucro and increasing in depth until the anterior margin of valve is reached at the girdle. The slope behind mucro almost straight but slightly concave near girdle.

Median valves.—Lateral area more strongly raised than is the case in any other known species of *Stenochiton*. This area is, in common with the rest of the shell, highly polished, the only sculpture being several concentric grooves following the growth-lines. The strong diagonal ridge which divides this area from the pleural area is formed by a rapid drop from the anterior margin to the pleural area, and not by any definite raising of the lateral area.

Pleural and dorsal areas.—Indistinguishable from one another, except that the latter is usually outlined by a dark V-shaped mark. Both areas are smooth and highly polished, but the pleural area, where it abuts on the lateral, has the appearance of being broadly hollowed out, thus adding to the abruptness of the separating ridge that forms the anterior margin of the lateral area. Slits 3 to 4 very narrow (Carpenter gives central valve 3 slits, Adams and Angus 5 slits). This character seems rather specific than generic. Girdle narrow, clothed with small, closely-packed, imbricating scales, which are more flattened than in *Stenochiton cymodocea*, and although straight-sided are almost as broad as long. The scales in the outer row are lengthened and pointed, under 1-inch objective resembling short blunt spicules. The effect of a fringed edge is hardly perceptible.

Measurements.—Total length of dried specimen not disarticulated, 40 mm. Length of valves taken longitudinally at suture: (1) 5 mm., (2) 3 mm., (3) 4 mm., (4) 4.25 mm., (5) 5.5 mm., (6) 6 mm., (7) 5.5 mm., (8) 5.5 mm. Breadth of valves: (6) 6.5 mm., anterior valve 4 mm., posterior valve nearly 6 mm. It will be seen that the shell is widest at the sixth valve, and tapers forward to the anterior valve. The tapering of the posterior valve is rapid, as has been before alluded to.

Remarks.—The shape of the anterior valve, great length of the shell, and the raised lateral area with its abrupt ridge, easily distinguish this species. They are rather specific differences than generic characters.

Note.—While I have in the choice of distinguishing names departed somewhat from the fashion that has mostly been followed heretofore by workers in *Polyplacophora*, I deem no apology is necessary. The striking habits of the group dealt with suggest that their names should be chosen with reference to them, rather than to their valvular structure.

EXPLANATION OF PLATES.

PLATE XIII.

- Fig. 1. *Stenochiton cymodocealis*, n. sp., side view.
 „ 2. „ „ *posidonialis*, n. sp., side view.
 „ 3. „ „ *juloides*, Ad. and Ang., side view.
 „ 4. „ „ *cymodocealis*, n. sp., from above, natural
 position.
 „ 5. „ „ „ n. sp., from above, flattened-
 out girdle.
 „ 6. „ „ *posidonialis*, n. sp., from above.
 „ 7. „ „ *juloides*, Ad. and Ang., from above.

PLATE XIV.

- Fig. 8. *Stenochiton juliodes*, Ad. and Ang., posterior valve.
 „ 9. „ „ „ Ad. and Ang., median valve.
 „ 10. „ „ „ Ad. and Ang., anterior valve.
 „ 11. „ „ *cymodocealis*, n. sp., *in situ*, on stem of
cymodocea.
 „ 12. „ „ „ (a) anterior valve.
 (b) median valve.
 (c) median, showing arch.
 (d) posterior valve.
 (e) inside of anterior valve,
 showing teeth.
 „ 13. „ „ *posidonialis*, n. sp., (a) anterior valve.
 (b) median valve.
 (c) posterior valve.
 (d) inside of anterior
 valve, showing
 teeth.
 „ 14. „ „ *pallens*, Ashby, (a) anterior valve.
 (b) median valve.
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